Think GAIA
For Life and the Earth

SANYO

Ultra-Low Temperature Chest Freezers

SANYO Ultra-Low Temperature Chest Freezer lineups for ultra-low temperature storage needs to support the forefront of life science researches.

The Ideal –152˚C, –86˚C Freezing Environment in Capacities from 86 L to 701 L

Ideal for long term preservation of biologicals, blood components and various cell line, SANYO preservation systems employ microprocessor control to maintain a high-precision temperature environment. They are not affected by ambient temperature, minimizing uneven temperature distribution within the chamber, and a temperature rise during door opening.

–152˚C Ultra-Low Temperature Chest Freezer

For stable long-term storage

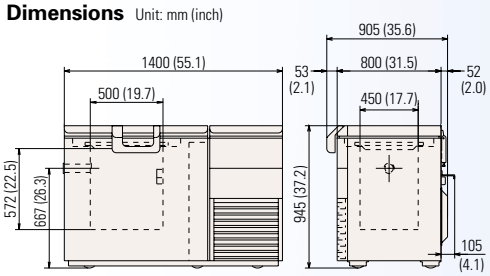
MDF-1156/1156ATN

TEMPERATURE **EFFECTIVE CAPACITY**

–152˚C 128 L (4.5cu.ft.)

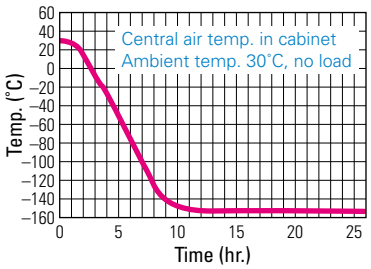
MDF-1156

Dimensions Unit: mm (inch)

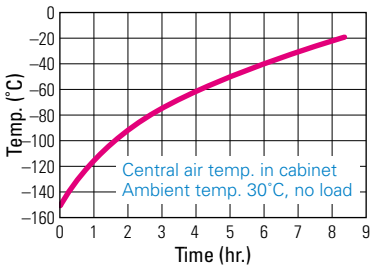


Performance Data

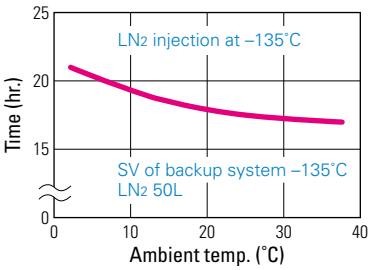
Pull-down characteristics under no-load condition



Pull-up characteristics during power failure



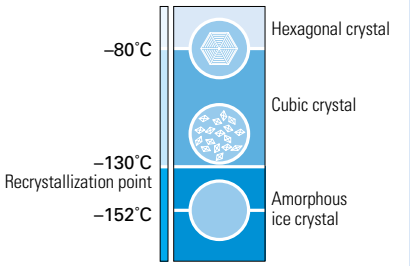
Effect of ambient temp. on holding time of liquefied gas



For MDF-1156/1156ATN

Why Freeze to –152˚C?

Recrystallization Mechanism (Artist's Concept)



World's lowest –152˚C freezer ensures stable cell and tissue preservation

An important factor to consider when preserving cells or tissue at ultra-low temperatures is to prevent amorphous ice crystals from recrystallizing within and outside the cells. Samples that are maintained in an ultra-low temperature freezer at –152˚C which is far lower than the recrystallization point (–130˚C for pure water) can be preserved semi-permanently. Preservation at ultra-low temperatures maintains vitrification without crystallization occurring inside and outside cells.
In contrast to conventional liquid nitrogen preservation containers, freezer preservation has numerous advantages: no sample contamination, no sudden liquid eruptions, as well as low operational costs.
SANYO's MDF-1156 and 1156ATN make long-term storage below the recrystallization point easier and more stable than ever before.

Advanced Features

Specially designed compressor and cascade refrigeration system

Specially designed for rugged ultra-low temperature applications in a laboratory environment (HFC refrigerants only).

Micro-processor Temperature Control with LED Digital Display

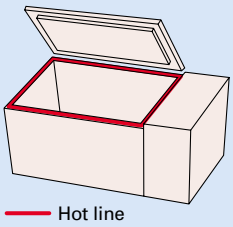
Extremely accurate, easy-to-read display. The temperature inside the freezer can be set and monitored easily by means of a microprocessor temperature control with an LED digital display. The thermostat incorporates a platinum resistor (Pt. 100Ω), precision and durability.

Integrated Cabinet Design

High-performance refrigeration system with foamed-in-place cabinet insulation maximizes interior temperature uniformity and protects against fluctuating ambient temperatures.

Hot line for secure sealing

Moisture condensation at the top edges of the cabinet due to differences in temperature inside and out causes frost and icing problems that may reduce heat insulation efficiency and obstruct door movements. These problems are prevented by the "hot line" by means of which hot gas from the higher temperature circuit is circulated through the problem areas.



Self-diagnostic function

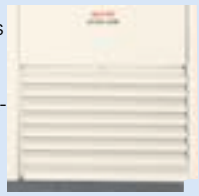
The temperature sensor, filter sensor and cascade sensor monitor operation conditions continuously. Should abnormality be picked up, an error code and the current temperature will be displayed in turn.

Ring back function

The alarm buzzer can be silenced by pressing the BUZZER key on the control panel. (The remote alarm signal is not cancelled.) Should the alarm condition continue after a certain suspension, the alarm buzzer sound will resume.

Easy Maintenance (MDF-193/193AT have no filters)

Filter check lamp notifys the user of a clogged condenser filter.The condenser filter is situated at the front panel to make filter removing and cleaning easier.



Note: The position of the filter check lamp is shown on the control panel (see photo shown at the bottom of this page).

Standard casters and levelling feet

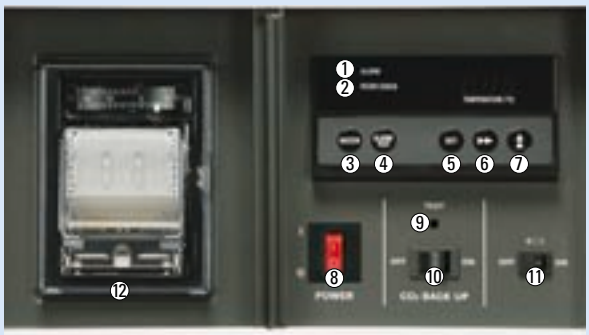
Standard-equipped heavy duty casters make it easy to move a freezer when necessary. The levelling feet keep a freezer level and firm on the floor.

Safety Device

Built-In Temperature & Power Failure Alarms (Lamp/Buzzer)

In case of power failure or an irregular rise in temperature, a rechargeable battery-operated indicator lamp and alarm will be activated. A compact recording unit which automatically records the inside temperature, and a backup system with liquefied CO_2 or N_2 which is selfactivated when a power outage occurs are also available separately. This equipment helps insure that the contents will be protected in the event of any power failure or mechanical trouble.

Control panel



MDF-394AT

① Alarm lamp and buzzer
② Filter check lamp
③ Buzzer key
④ Alarm test key
⑤ Mode setting key
⑥ Digit shift key
⑦ Numerical value shift key
⑧ Power switch
⑨ CO_2 back-up test swich (AT type only)
⑩ CO_2 back-up swich (AT type only)
⑪ Battery switch
⑫ Temperature recorder

–86°C Ultra-Low Temperature Chest Freezers

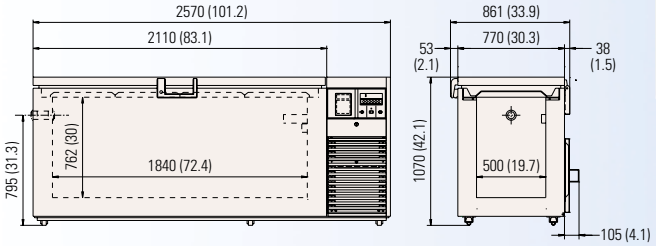
Ideal for large-capacity preservation

MDF-794/794AT

TEMPERATURE **EFFECTIVE CAPACITY**

–86°C **701 L (24.8cu.ft.)**

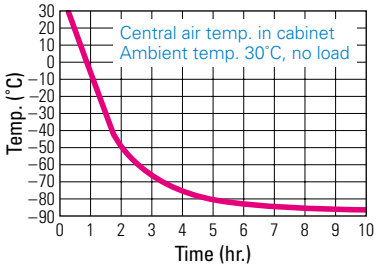
Dimensions Unit: mm (inch)



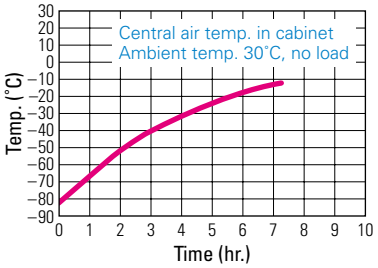

MDF-794AT

Performance Data

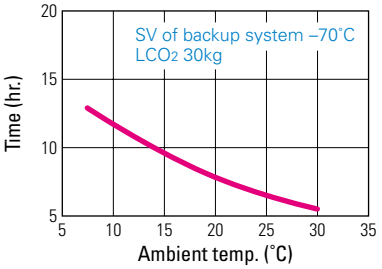
Pull-down characteristics under no-load condition



Pull-up characteristics during power failure



Effect of ambient temp. on holding time of liquefied gas



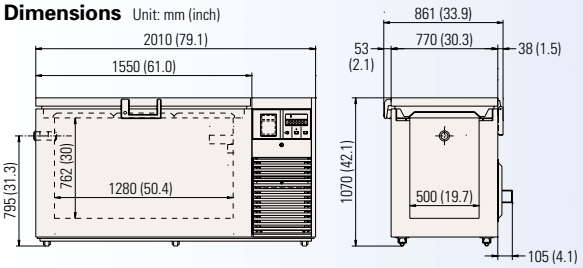
Ideal for middle-sized installation space

MDF-594/594AT

TEMPERATURE **EFFECTIVE CAPACITY**

–86°C **487 L (17.1cu.ft.)**

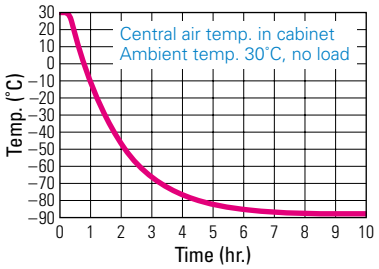
Dimensions Unit: mm (inch)



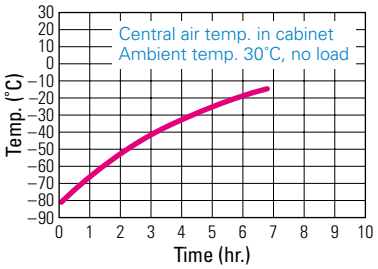

MDF-594AT

Performance Data

Pull-down characteristics under no-load condition



Pull-up characteristics during power failure



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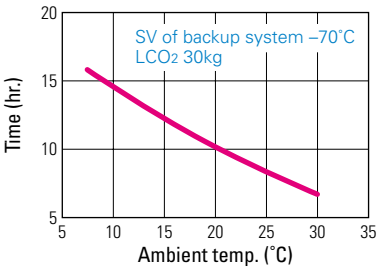


Low-profile design for easy access to stored materials

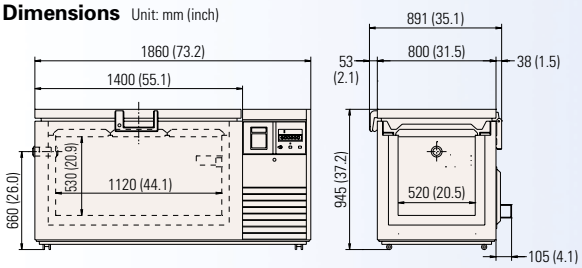
MDF-394

TEMPERATURE **EFFECTIVE CAPACITY**

–86°C **309 L (10.9cu.ft.)**

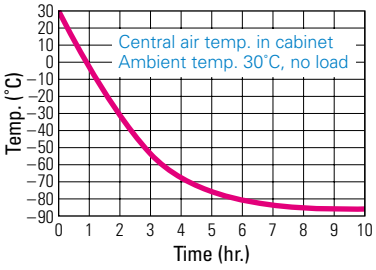

MDF-394

Dimensions Unit: mm (inch)

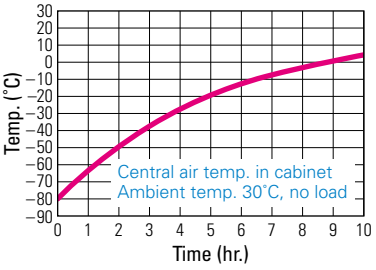


Performance Data

Pull-down characteristics under no-load condition



Pull-up characteristics during power failure



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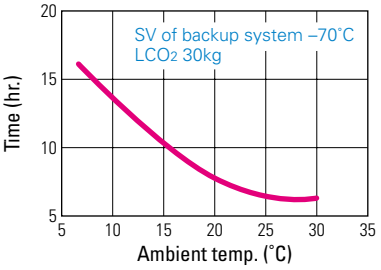


Compact, space-saving unit optimized for private use

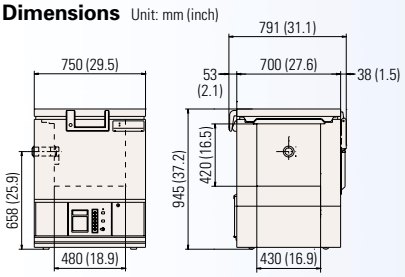
MDF-193/193AT

TEMPERATURE **EFFECTIVE CAPACITY**

–86°C **86 L (3.0cu.ft.)**

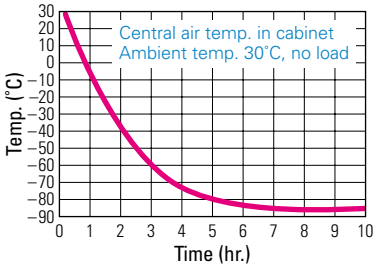

MDF-193

Dimensions Unit: mm (inch)

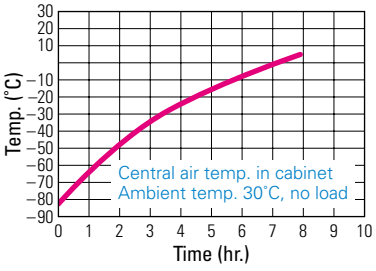


Performance Data

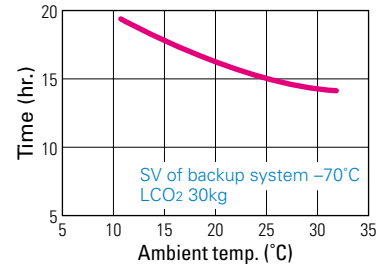
Pull-down characteristics under no-load condition



Pull-up characteristics during power failure



Effect of ambient temp. on holding time of liquefied gas



Specifications

Model No.		MDF-1156/1156ATN	MDF-794/794AT	MDF-594/594AT	MDF-394*	MDF-193/193AT
Temperature Range		–125˚C to –152˚C	–50˚C to –86˚C			
Exterior Dimensions [W x D x H] mm (inch)		1,400 x 800 x 945 (55.1 x 31.5 x 37.2)	2,570 x 770 x 1,070 (101.2 x 30.3 x 42.1)	2,010 x 770 x 1,070 (79.1 x 30.3 x 42.1)	1,860 x 800 x 945 (73.2 x 31.5 x 37.2)	750 x 700 x 945 (29.5 x 27.6 x 37.2)
Interior Dimensions [W x D x H] mm (inch)		500 x 450 x 572 (19.7 x 17.7 x 22.5)	1,840 x 500 x 762 (72.4 x 19.7 x 30.0)	1,280 x 500 x 762 (50.4 x 19.7 x 30.0)	1,120 x 520 x 530 (44.1 x 20.5 x 20.9)	480 x 430 x 420 (18.9 x 16.9 x 16.5)
Effective Capacity		128 liters (4.5 cu.ft.)	701 liters (24.8 cu.ft.)	487 liters (17.1 cu.ft.)	309 liters (10.9 cu.ft.)	86 liters (3.0 cu.ft.)
Exterior Cabinet		Galvanised steel with baked on finish				
Interior Cabinet		Aluminum plate	Stainless steel			
Inner Lid		1	4	3		1
Insulation		Foamed-in-place rigid polyurethane				
Compressor	High stage side	Hermetic type, 1,100 W			Hermetic type, 450 W	Hermetic reciprocated type,
	Low stage side	Hermetic type, 1,100 W			Hermetic type, 750 W	450 W
Evaporator	High stage side	Cascade condenser				Tube-on-sheet type
	Low stage side	Tube on sheet (shared with interior)				
Condenser	High stage side	Fin and tube type	Fin and tube type			Finless tube type
	Low stage side	Cascade condenser	Shell and tube type	Cascade condenser		
Temperature Control		Microprocessor control system, Non-volatile memory	Microprocessor: Keypad input Temp. input range: –20˚C to –95˚C (1˚C increment) Set value memory: non-volatile memory			
Temperature Display		Digital display				
Sensor		Platinum resistance (Pt. 1000 Ω)				Platinum resistance (Pt. 100 Ω)
Safety		Cylinder key on the lid handle and Mouse proof cover on the back side				
Alarm system		Selectable high temp. alarm (+10˚C & +15˚C from set point)			Adjustable high and low temp. alarm (±5˚C to ±20˚C from set point)	
		Power failure alarm, Filter check lamp (Except MDF-193/193AT which have no filters), Remote alarm contact				
Net Weight (Approx.)		265kg (584 lbs.) —1156 272kg (600 lbs.) —1156ATN	335kg (739 lbs.) —794 345kg (761 lbs.) —794AT	291kg (642 lbs.) —594 301kg (664 lbs.) —594AT	219kg (483 lbs.)	103kg (227 lbs.) —193 109kg (240 lbs.) —193AT

ATN: LN_2 backup system, temperature recorder
AT: LCO_2 backup system, temperature recorder
*MDF-394 for 110 to115V and 220V/60Hz is unavailable.

Optional Accessories

Storage Racks (Aluminium)

Model No.	MDF-19SC	MDF-39SC	MDF-49SC	MDF-59SC
Case Dimensions (W x D x H)	207 x 144 x 413mm 8.1″ x 5.7″ x 16.3″	155 x 155 x 515mm 6.1″ x 6.1″ x 20.3″	207 x 144 x 539mm 8.1″ x 5.7″ x 21.2″	207 x 144 x 665mm 8.1″ x 5.7″ x 26.2″
Number of Drawers	3	4	4	5
Applicable Model (Rack capacity)	MDF-193/193AT (6)	MDF-394 (20)	MDF-1156/1156ATN (6)	MDF-594/594AT (18) MDF-794/794AT (24)

Temperature Recorder

Model No.	MTR-85H	MTR-155H
Recording Range	–100 to +50˚C	–170 to +30˚C
Freezer Model	MDF-193 MDF-394 MDF-594 MDF-794	MDF-1156

Inventory Racks (Stainless steel)

Model No.	Box Type (Capacity)	External Dimensions (mm)			Freezer Model (Rack capacity)
		Width	Depth	Height	
IR-207C	2″ (7)	144	142	405	MDF-193 (6)
IR-209C	2″ (9)	144	142	518	MDF-394 (21), 1156 (9)
IR-213C	2″ (13)	144	142	592	MDF-594 (24), 794 (36)
IR-305C	3″ (5)	144	142	405	MDF-193 (6)
IR-306C	3″ (6)	144	142	518	MDF-394 (21), 1156 (9)
IR-309C	3″ (9)	144	142	747	MDF-594 (24), 794 (36)


IR-209C IR-306C MDF-39SC MDF-59SC

ULT-Freezer Backup Kits

CVK-UB2/UB2(I): LCO_2 Backup Kit for MDF-794/594/394
CVK-UBN2/UBN2(I): LN_2 Backup Kit for MDF-794/594/394
CVK-A: Built-in LCO_2 Backup Kit for MDF-794/594/394/193
CVK-AT2: LCO_2 Backup Kit for MDF-1156
CVK-ATN2: LN_2 Backup Kit for MDF-1156
(I) version for North America only

*Cooling performance is indicated by the temperature reached at the center of the freezer (at ambient temperature of 30°C with no load). In order to use the freezer at a stable temperature for a long time, it is recommended that the temperature be set to at least 5°C higher than the indicated lowest temperature.
In addition, depending on the usage conditions, it may not be possible to reach the indicated lowest temperature.

Caution:
SANYO guarantees the product under certain warranty conditions.
SANYO in no way shall be responsible for any loss of content or damage to content.
• Appearance and specifications are subject to change without notice.

SANYO Electric Co., Ltd., Biomedical Division, Gunma is certified for:
Quality management system: ISO9001 / Medical devices quality management system: ISO13485 / Environmental management system: ISO14001
RoHS (European Restriction of Hazardous Substances directives) compliant

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SHR141